PROJECT facts

U.S. DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY
NATIONAL ENERGY TECHNOLOGY LABORATORY

Fuel Cells

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SOLID OXIDE FUEL CELL HYBRID SYSTEM FOR DISTRIBUTED POWER GENERATION

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Description

GE Hybrid Power Generation Systems (GE HPGS) will develop and demonstrate a modular 3- to 10/kW planar solid oxide fuel cell/gas turbine hybrid system that meets a wide range of power generation needs. Using technology developed in related fuel cell projects, GE HPGS has developed a low-cost, high-performance, compact planar SOFC, creating a system capable of 65 percent or more efficiency, with no greenhouse gas emissions, and low-noise, allowing flexibility in situating this system near the customer. The hybrid concept integrates planar SOFC and gas turbine power technologies, and operates at 800 °C with fuel from a steam reformer.

Project Goals

Phase I focuses on optimizing the hybrid system concept by resolving the technical issues impeding commercialization, namely, lowering manufacturing costs and improving performance. Phase I will demonstrate this prototype system to meet the efficiency and cost requirements of the SECA program, to provide a baseline for interim program goals.

Phase II will focus on building and operating the system to analyze configuration and packaging for a selected application, as well as estimating costs, evaluating the market, and improving technology, engineering, and manufacturing to meet interim and long-term SECA program goals.

Phase III will focus on modifying and refining the system, advancing technologies and incorporating these improvements into the system, and will culminate in an extended field test of a packaged system.

Solid Oxide Fuel Cell Hybrid System for Distributed Power Generation

PRIMARY PROJECT PARTNER

GE Hybrid Power Generation Systems
Torrance, CA

COST SHARING

DOE	$10,219,690
Non-DOE	$ 2,558,637

STRATEGIC CENTER FOR NATURAL GAS WEBSITE

www.netl.doe.gov/scng

CUSTOMER SERVICE

800-553-7681

Benefits

GE Hybrid Power Generation Systems is part of the SECA Program, which encourages the development of commercially viable solid oxide fuel cell power generation systems at a cost of $400/kWe.

Hybrid fuel cell/turbine systems based on planar solid oxide fuel cells will have many attractive features that achieve SECA's goals for efficiency and cost effectiveness that naturally benefit a distributed generation market:

- **High efficiency**—of 65 percent or more, hybrid systems promise more power using less fuel.
- **Low cost**—combining the planar SOFCs with a commercial gas turbine leads to a low-cost solution for smaller hybrid systems.
- **Low emissions**—the highly efficient hybrid system operates with virtually no greenhouse gas emissions for a cleaner environment.
- **Low noise**—the SOFC and gas turbine hybrid is a low-noise system that lends itself to situation near the customer.

GE's self-contained prototype will be able to operate on a variety of fuels and can be designed as a stand-alone power plant tailored for a specific market, or it can be integrated into a larger system.

Small-scale distributed power generation systems are fast reaching maturity. As part of the SECA program, these modular power systems are designed to suit the varying needs of commercial, industrial, and residental markets, such as hospitals, shopping centers, and apartment complexes to provide clean, affordable electricity to meet increasing demands.